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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

OAT MOUNTAIN FLIGHT EXPERIMENT

SAN JOAQUIN PROJECT, 1925

by

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Entomologist
U.S. Bureau of Entomology

Forest Insect Laboratory
Stanford University California
April 27, 1928

GOVERNMENT PRINTING OFFICE

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OAT MOUNTAIN FLIGHT EXPERIMENT

San Joaquin Project, 1925

Previous Experiments to Determine Probable Flight Habits of the Western Pine Beetle

A report entitled "Western Pine Beetle Flight Study, San Joaquin Project, 1924" was submitted by Miller and Person in June 1927, which reviewed briefly previous efforts to secure records of the distances covered by the western pine beetle in its flight to attack new trees. It also covered the details of a flight study carried on in connection with the western pine beetle control work of the San Joaquin Project.

In this 1924 study a circular area of 3200 acres, designated as the Forked Meadow Unit, was cleared of all infested trees of the 1923 overwintering generation by a thorough control campaign during the spring of 1924. The area was then kept under surveillance throughout the season of 1924, and all newly-infested trees located as soon as possible after attack. As the first flight period of 1924 started with the area as clear of infestation as it was possible to make it by artificial control work, it was obvious that newly-infested trees within the area would be attacked by beetles flying in from the borders. As this unit was entirely surrounded by yellow pine type this flight could come from any direction. The radius of the area was less than 1½ miles, so that it was not necessary for beetles to fly farther than this distance to attack trees in its center.

During the course of the 1924 season the Forked Meadow Unit was so completely reinfested that the volume of timber killed in 1924 was more than twice that of the preceding season of 1923. The average distance from trees attacked to the nearest tree from which beetles might have emerged was less than one-half mile, and did not exceed one mile at the maximum.

Conditions and Results of the Oat Mountain Experiment in 1925

A similar experiment to secure further data as to the distance beetles may travel in reinfesting an area after it has been cleaned by control work was carried out on the Oat Mountain area in 1925. This area fronts the southern boundary of the yellow pine type north of the San Joaquin River Canyon. It consists of about 2500 acres on which the yellow pine extends southerly in the form of a peninsula to a point known as Oat Mountain. The timber type is very sharply cut off from brush and open grass areas on both the south and west of this point (see maps). The conditions of this area limit considerably the directions from which beetles might come in reinfesting the pine type after it has been cleaned up by control work. If the beetles do not come from the general pine belt to the north and east they would have to fly across the San Joaquin Canyon from pine areas six to eight miles distant.

During the winter of 1924 and spring of 1925 control work was carried on over an area defined by drawing a two-mile radius from the point of the pine type on Oat Mountain. All infested trees, including those attacked by D. brevicomis, Ips spp. and flathead borers, were cut and burned. Both the cruising and treating of these trees were very

thoroughly done, and all top-killed trees showing any suspicion of infestation were felled and the bark burned. It is doubtful if any small amount of infestation remained on the area after this clean-up. Altogether 60 trees with a volume of 74,950 board feet were treated.

The following table gives the volume of losses that developed during the 1924 and 1925 seasons:

	1924 No.Trees	1924 Volume bd.ft.	1925 No.Trees	1925 Volume bd.ft.
Dendroctonus brevicomis				
Summer brood, not treated	20	38,110	79	123,200
Winter brood, not treated	6	5,470	36	60,250
Winter brood, treated	49	63,810		
Ips spp.				
Winter brood, treated	5	1,340		
Winter brood, untreated	-	-	4	10,200
Flathead Borers				
Summer brood, untreated	4	5,290	10	2,880
Winter brood, treated	6	4,800	—	———
Total	90	123,820	129	296,500

A second cruise of the area was made in the spring of 1926, and all the trees on the area that had been attacked during the 1925 season were mapped. In this cruise trees of the two summer generations were distinguished from the overwintering generation, but it was not possible to discriminate between trees of the summer generations.

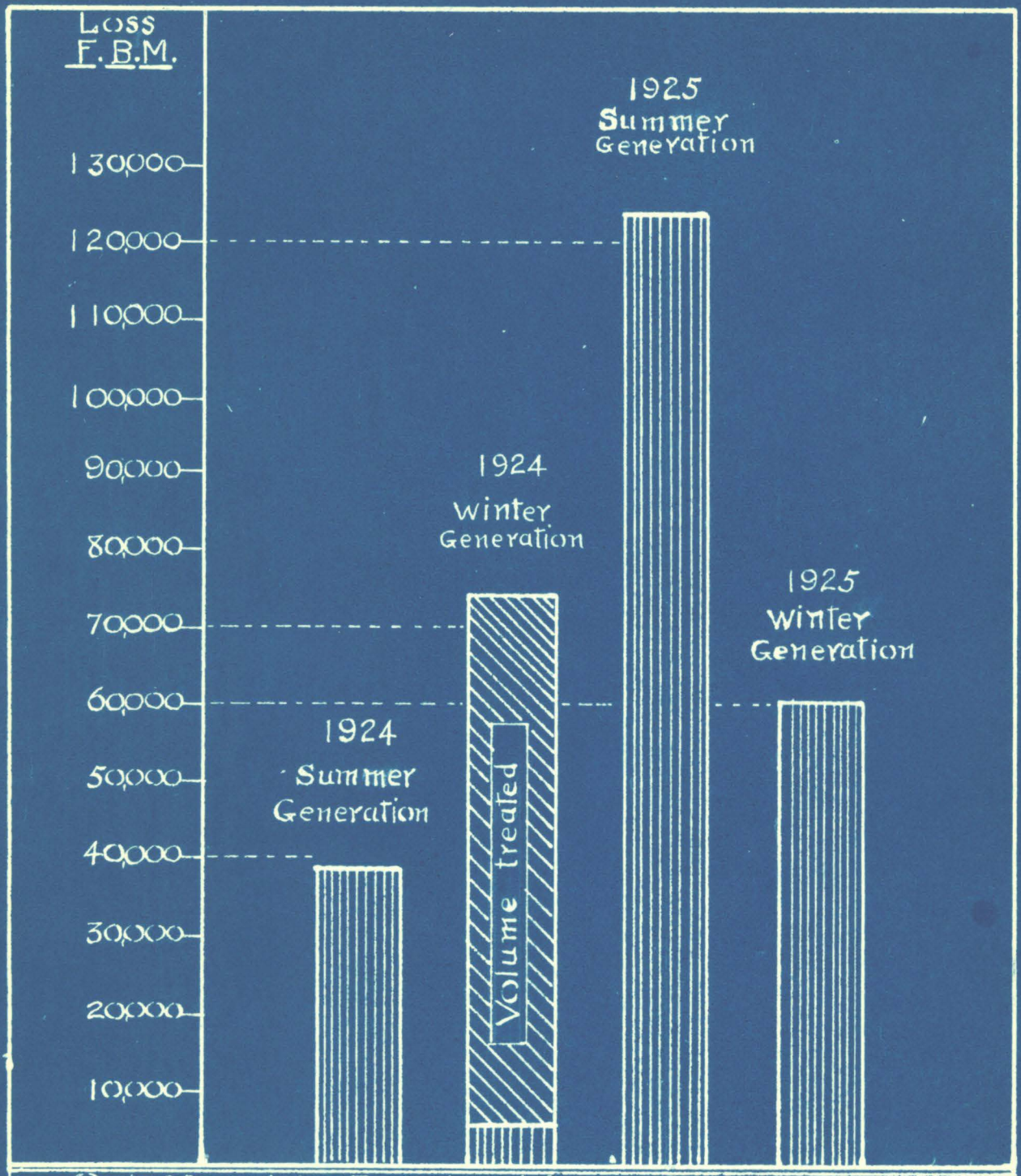
The new infestation within the control area was built up in 1925 by the first and second summer generations of the western pine beetle. By the fifteenth of August of that season the beetles had come back into the area to such an extent that the loss of trees due to attacks of the summer generations exceeded the loss caused by the overwintering generations of 1924.

The distribution of the 1924 overwintering trees is shown on Map No. 1, while the distribution of the 1925 summer generations is shown on Map No. 2. It can be seen from a comparison of these maps that:

1. The beetles spread over the area so that the distribution of the 1925 summer trees corresponds closely to that of the 1924 overwintering trees;
2. The beetles reached the extreme limit of the pine type on Oat Mountain;
3. This spread represents a flight of 1½ miles at the minimum and two miles at the maximum covered by the two summer generations.

One striking point regarding the 1925 infestation was that trees Nos. 130, 120 and 116, near the extreme southwestern boundary of the pine type on Oat Mountain, were all large yellow pine which were heavily infested by western pine beetle broods. The beetles must therefore have come to these trees in considerable numbers to establish their attacks. The flight to these trees could not have been made by a few beetles attacking by mere chance, but must have been controlled by a definite attraction, which drew the beetles in large numbers for a considerable distance.

This experiment supplements previous records of the flight habits of the western pine beetle. The results substantiate those records secured by the Forked Meadow experiments carried on in 1924, but also indicate that the probable distance of flight may be about twice that recorded by the 1924 experiment.



Oat Mountain Experimental Area-Sierra National Forest
Volume of Yellow Pine Killed by Seasonal Generations of Western Pine Beetle in 1924 and 1925.